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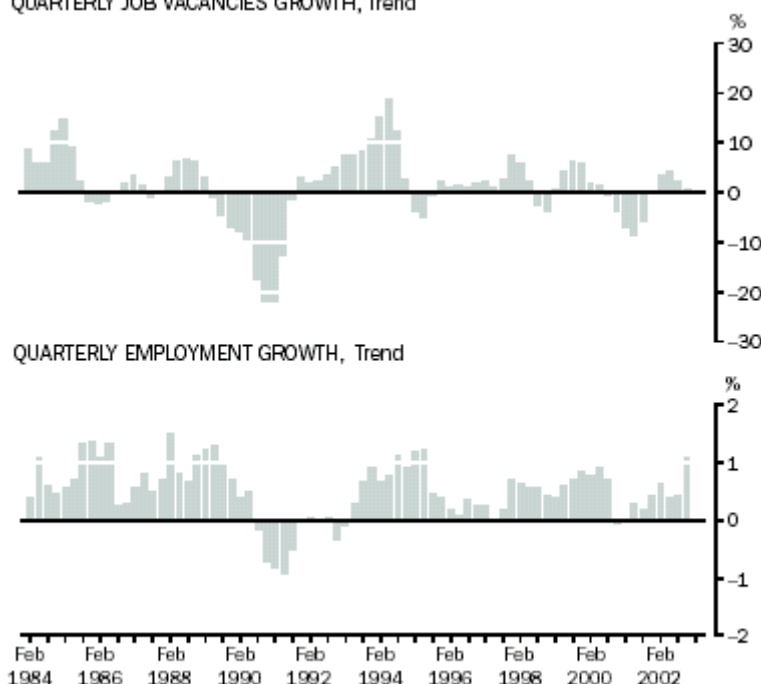
Feature Article - Do job vacancies provide a leading indicator of employment growth?

INTRODUCTION

Each quarter the Australian Bureau of Statistics (ABS) publishes estimates of the total number of job vacancies in Australia. Estimates are also published for the private and public sectors, for each state and territory, and for the major industry groups. These estimates come from the quarterly ABS Job Vacancies Survey which is a nation-wide survey of employers. The ABS has been collecting data on job vacancies since 1973. A quarterly job vacancies series has been produced since 1979, with state/territory and industry dissections available since 1983.

Job vacancies statistics provide an important indicator of current and future demand for labour. As illustrated in figure 1, there is a relationship between change in the number of job vacancies and growth in employment. Although change in the number of job vacancies can provide an indication of short-term employment growth, job vacancies statistics can also be used as an indicator of longer-term employment growth. Changes in the number of job vacancies are used by a number of government and other research agencies for economic modelling, and for forecasting employment and economic growth.

FIGURE 1:
QUARTERLY JOB VACANCIES GROWTH, Trend



Note: The y-axis scale is different in each panel.

Source: Job Vacancies, Australia (cat. no. 6354.0), Labour Force, Australia (cat. no. 6202.0).

This article looks at the relationship between changes in job vacancies and employment growth. It first looks at this relationship in terms of how an increase in demand for goods and services may translate into decisions to hire additional workers, and to employment growth. The article then describes two statistical methods for analysing the strength of the relationship between job vacancies and employment growth, and presents the results of the analysis.

Based on data from 1984 to 2002, the analysis shows that the ABS job vacancies series has been a 'leading indicator', leading employment growth on average by around 3 quarters, although the lead period was longer for peaks than for troughs in employment growth, and there has been a decline in the lead period in more recent business cycles.

VACANCIES AND EMPLOYMENT GROWTH

In the short term, the demand for labour is affected by growth in output (i.e. the production of goods and services). For example, an increase in demand for a firm's product may lead initially to an increase in the number of hours worked by existing employees. If the increase in demand is sustained, the employer may want to increase the number of workers employed to sustain the increased level of output. A job vacancy is created between the period of increased output and the eventual employment of additional staff. A decrease in demand for a firm's product may also affect labour demand, initially as a decrease in hours worked and fewer vacancies and, if demand remains subdued, as a decrease in employment.

It may take some time from when recruitment action is undertaken to the time a position is filled, so that an increase in job vacancies in the current period may lead to an increase in employment in a subsequent period. If the time between lodging and filling a vacancy is reduced, the expected lead time between vacancies and employment growth may fall. Changes in the efficiency of the labour market in matching skills required by employers with the skills of job seekers may also have an impact on the relationship between vacancies and employment growth.

The vacant position may be filled by a person moving from one job to another (labour market 'churning'), delaying the increase in total employment even further. Because vacancies can be created as a result of existing employees leaving their jobs to move to another job, to become unemployed, or to leave the labour force altogether, the current number of job vacancies may overstate the number of **new** jobs. The combination of factors such as 'churning' in the labour market and changes in the efficiency of the labour market may have an impact on the statistical relationship between changes in job vacancies and employment growth over time, and will vary with the stage of the economic cycle, although their impact may be difficult to isolate.

STRENGTH OF THE RELATIONSHIP

The relationship between job vacancies and employment growth was analysed using two statistical techniques:

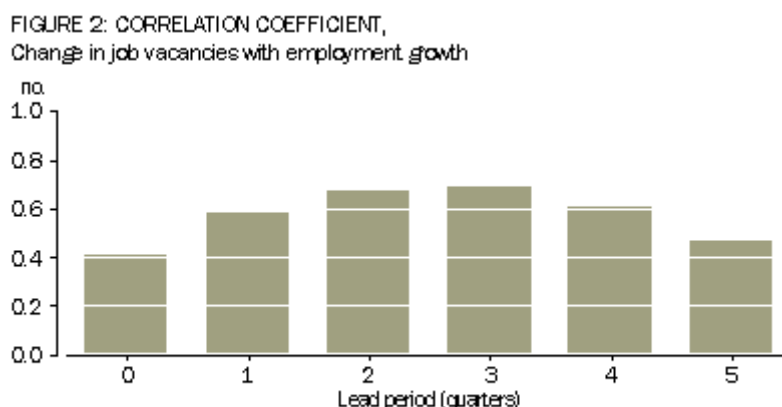
- correlation analysis
- turning point analysis.

The statistical analysis uses estimates of job vacancies and estimates of the number of people employed, over the period February 1984 to November 2002. The job vacancies series, which represents the number of employee jobs available for immediate filling and for which employers have undertaken recruitment action, is based on the quarterly ABS Job Vacancies Survey

conducted in February, May, August and November each year. The estimates of employment are based on monthly Labour Force Survey (LFS) results for those same months. The LFS provides information about the labour market activity of Australia's population, such as the number of people employed, unemployed and not in the labour force. The employment series measures the number of employed people, some of whom may have more than one job, and includes self-employed persons as well as employees.

Correlation analysis is used to measure the degree of linear association between two variables. The higher the correlation coefficient (i.e. closer to +1 or -1), the stronger the association between the two variables. The sign of the coefficient indicates the nature of the relationship - a large positive coefficient indicates that high values of one variable tend to be associated with high values of the other variable. By examining the correlation between the job vacancies and employment series, the strength of the relationship between the two series can be assessed. The analysis can also examine whether vacancies are more strongly correlated with employment growth in future (or previous) quarters (lead-lag analysis).

A primary requirement when using correlation analysis is that all series should be 'stationary', with constant mean and variance. Employment, for example, increases continually (trends upwards) over the reference period and is considered a 'non-stationary' series. It is therefore important to remove the long-term trend component of the series to be analysed. If the trend component is not removed, the analysis may give misleading results, because the strength of the correlation would relate more to the common trend in the two series rather than quarterly movements. Removing the trend was achieved by applying the correlation analysis to quarter on quarter percentage change in the trend job vacancies and employment series.

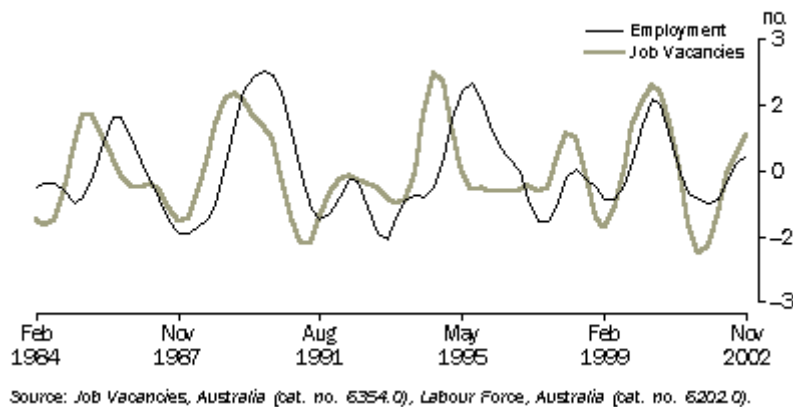


Source: Job Vacancies, Australia (cat. no. 6354.0), Labour Force, Australia (cat. no. 6202.0).

Results from the analysis show that there is a linear association between the quarterly changes in job vacancies and employment over the period 1984 to 2002, and that the quarterly changes tend to move in the same direction. The analysis also compared the strength of the relationship between changes in job vacancies in one quarter and employment growth in the following 1 to 5 quarters (figure 2). The strongest correlation coefficient (of 0.69) was found between the job vacancies series in one quarter and the employment series 3 quarters ahead, indicating that the growth in job vacancies leads employment growth by about 3 quarters.

Turning point analysis involves capturing the business cycle component from each series (by identifying the cyclical component from the other time series components such as seasonal, irregular and long-term trend components) and then comparing the respective lead-lag relationship over time. Broadly, this entails applying Henderson moving averages to remove short cycles of less than two years and very long cycles of more than eight years.

FIGURE 3: TURNING POINT ANALYSIS, Standard deviations from long-term trend



The turning point analysis can be used to analyse cycles, where a full cycle represents the movement from peak - trough - peak or from trough - peak - trough. Figure 3 illustrates the cyclical component of the two series (as standard deviations from the long-term trend, to provide a clearer visual representation of the turning points). It indicates that the employment and job vacancies series have four full cycles between February 1984 and November 2002.

The graph suggests that changes in the job vacancies series lead employment growth peaks by between 0 and 4 quarters over the period. The lead relationship appears to be shorter (0 to 2 quarters) for troughs. The lead period between peaks in job vacancies and employment series appears to have reduced recently, possibly reflecting changes in the overall performance of the labour market in matching job vacancies and jobseekers.

OTHER STATISTICS OF JOB VACANCIES

The ABS job vacancies statistics are the main source of estimates of the number of unfilled positions available at a point in time. However, the series are not the only source of information about job vacancies. The number of job advertisements can also reflect the number of vacant jobs. Although these may be easier to count than the number of unfilled positions, job advertisements have some drawbacks. For example, a vacancy can be advertised several times, or not at all, and a single job advertisement may refer to multiple vacancies.

The monthly ANZ Bank newspaper job advertisements series has been compiled from newspaper job advertisements placed in major metropolitan newspapers around Australia since 1975. The series is used by economic modellers and forecasters as an indicator of employment growth and of economic activity. The same two statistical techniques were applied to measure the strength of the relationship between the ANZ Bank job advertisements series and employment growth. The results were similar to those for the ABS job vacancies series. Over the period 1984 to 2002, the ANZ Bank series had its strongest correlation coefficient (of 0.75) at a lead period of 3 quarters. The turning point analysis shows job advertisements leading peaks in employment growth by 1 to 3 quarters. The lead relationship is shorter for troughs, ranging from 0 to 2 quarters. As with the ABS job vacancies series, the lead period between peaks in ANZ Bank job advertisements series and the employment series appears to have reduced recently.

The Department of Employment and Workplace Relations also compiles three series of job vacancies. The Skilled Vacancies Index, which has been available since 1981, is based on a count of advertisements for skilled workers (professional, associate professional and trades occupations) in the major metropolitan newspapers. This series is designed to measure skilled vacancies only, and leaves out a considerable proportion of job vacancies. Nevertheless, the series has followed a similar pattern to the ABS series and the ANZ Bank series. The Information

and Communication Technology (ICT) Vacancy Index, which is available only since January 2000, measures demand for people with information and communication technology skills, using information from a number of online recruiting sites. The Vacancies on Australian JobSearch series refers to the number of positions available, based on information lodged by employers and Job Network members with the Department of Employment and Workplace Relations employment site Australian JobSearch.

FURTHER INFORMATION

This article also appears in the May 2003 issue of **Australian Economic Indicators** (cat. no. 1350.0).

More detailed analysis was also conducted using cross-spectral techniques which assess the lead-lag relationship at varying cycle lengths. These results were in line with the correlation and turning point analysis.

For further information about the methods used and the results of this analysis, please contact Daniel Smith on Canberra 02 6252 7649, or email [<daniel.smith@abs.gov.au>](mailto:daniel.smith@abs.gov.au). For information on the ABS Job Vacancies series, please contact Manpreet Singh on Perth 08 9360 5304, or email [<manpreet.singh@abs.gov.au>](mailto:manpreet.singh@abs.gov.au).

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